



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : A22B 3. 0, A22C 17/00	A1	(11) International Publication Number: WO 92/04828 (43) International Publication Date: 2 April 1992 (02.04.92)
---	-----------	--

(21) International Application Number: **PCT/DK91/00266**
 (22) International Filing Date: **13 September 1991 (13.09.91)**
 (30) Priority data:
 2188/90 13 September 1990 (13.09.90) DK

(71) Applicant (for all designated States except US): GH MAS-
KINTEKNIK A/S [DK/DK]; Solvangsvej 25, DK-9700
Broenderslev (DK).

(72) Inventor; and

(75) Inventor/Applicant (for US only) : HOLM, Gert [DK/DK];
Solvangsvej 25, DK-9700 Broenderslev (DK).

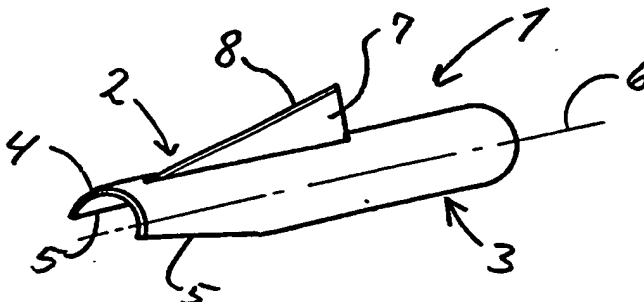
(74) Agent: LEHMANN & REE A/S; Grundtvigsvej 37, DK-
1864 Frederiksberg C (DK).

(81) Designated States: AT (European patent), BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), NL (European patent), SE (European patent), US.

Published

*With international search report.
In English translation (filed in Danish).*

(54) Title: TOOL AND METHOD OF SEPARATING RIBS FROM BELLIES OF SLAUGHTERED ANIMALS

**(57) Abstract**

A tool (1) for effective and quick separation of ribs from bellies consists of a segment (2) of a substantially tubular element (3). The segment (2) is limited by a front circular edge (4) and by two rectilinear edges (5) extending across an angle in relation to the central axis (6) of the tubular segment (3). At its outer circumference the segment (2) comprises a plate (7) which is provided with a cutting edge which is directed outward and forward against the front circular edge (4). When the front edge (4) of the tool (1) is introduced between a rib and the bone fascia, the tool is guided by the unbroken bone fascia, and when the tool is pushed forward the edge (8) will cut up the bone fascia while the front edge (4) separates the bone fascia over a substantial part of the circumference of the ribs. Thus the rib can subsequently be removed without risk of the bone fascia being included or without risk of removing adhering meat simultaneously.

BEST AVAILABLE COPY

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MG	Madagascar
AU	Australia	FI	Finland	ML	Mali
BB	Barbados	FR	France	MN	Mongolia
BE	Belgium	GA	Gabon	MR	Mauritania
BF	Burkina Faso	GB	United Kingdom	MW	Malawi
BG	Bulgaria	GN	Guinea	NL	Netherlands
BJ	Benin	GR	Greece	NO	Norway
BR	Brazil	HU	Hungary	PL	Poland
CA	Canada	IT	Italy	RO	Romania
CF	Central African Republic	JP	Japan	SD	Sudan
CG	Congo	KP	Democratic People's Republic of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SN	Senegal
CI	Côte d'Ivoire	LJ	Liechtenstein	SU ⁺	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
CS	Czechoslovakia	LJ	Luxembourg	TG	Togo
DE*	Germany	MC	Monaco	US	United States of America
DK	Denmark				

⁺ Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

TOOL AND METHOD OF SEPARATING RIBS FROM BELLIES OF SLAUGHTERED ANIMALS.

Background of the invention.

The present invention relates to a tool for separating ribs from bellies of slaughtered animals and comprising at least one cutting edge.

5

So far the ribs have been removed manually in slaughterhouses. However, in recent years tests have been made with more machines for mechanical removal of the ribs. It is desirable that the ribs are removed without removing the meat simultaneously as this results in waste. Moreover, it is desirable that the belly appears esthetic after the removal of the ribs, i.e. without being torn up. So far this has been a problem which only could be remedied by a demanding pre-treatment of the belly. Till now the pre-treatment has comprised cutting open the bone fascie along the upper side of the ribs by using an ordinary knife. Then a partial severance of the cartilaginous tissue of the ribs is performed by cutting away a part of this. This has been both a demanding and risky process. Moreover, the result has not always been satisfactory as the bone fascie are not symmetrically cut up. Thus, relatively large loose parts of the bone fascie may occur resulting in that the belly does not appear esthetic.

20

It is the object of the present invention to provide a tool which remedies the above-mentioned drawbacks and which permits a quick and effective pre-treatment of the bellies.

25

According to the invention this is obtained with a tool which is characterized in that the tool consists of a segment of a substantially tubular element, said segment being limited by a front circular edge extending across an angle at the centre from approximately 0° to approximately 180° and by two substantially rectilinear edges emanating from the circular edge and running at an angle of approximately 0° to approximately 20° in relation to the longitudinal axis of the tubular element, that the tool is made of a resilient material, that at least the central part of the front circular edge is made from a hard preferably knockproof material, that at least the one of the cutting edges is mounted radially projecting from the outer circumference in a position opposite the front circular edge, and that the cutting edge is directed forward and is mounted at an angle in relation to the longitudinal axis.

35

By means of this tool it is obtained that the flexible segment surrounds a rib as a cover and when the tool manually or mechanically is guided forward along a rib the segment will be guided along the rib which causes the cutting edge mounted thereon to perform a symmetrical cut of the bone fascia in an effective way. As the segment has two inclined rectilinear edges the connection between the rib and the bone fascia is moreover severed all over the part of the rib that faces outward. This causes the ribs to be more satisfactorily separated from the peritoneum that would be the case if only an ordinary knife was used for cutting through the bone fascia. As the cutting edge is positioned on the outer circumference of the segment the front circular edge of the segment is positioned in the space between the bone fascia and the rib before the bone fascia is cut open. As the segment is limited by the two inclined rectilinear edges, the front circular edge will usually only extend over a small angle at the centre which causes the front edge to be easily introduced into and guided between the rib and the bone fascia.

In a preferred embodiment the marginal front circular edge is made in one piece with the remaining part of the segment through a casted hinge connection. This further ensures the steady engagement of the front edge with the rib. If the tool is provided with a front edge of metal which is fastened in a plastic cover a long durability is obtained just as the front edge may advantageously be provided with a chamfered edge.

In practice different tools with different profiles are used adapted to the different shape of ribs in the same belly or in different bellies.

Furthermore, the invention relates to a method of separating ribs from bellies of slaughtered animals by means of a tool of the above-mentioned type characterized in comprising the steps of guiding the front circular edge between the rib and the bone fascia with the radially orientated edge turned away from the rib, pressing forward the tool manually or mechanically along the rib with the front edge of the segment abutting the rib, and guiding the tool past the cartilaginous tissue between the rib and the meat.

By means of this method a belly is pre-treated quickly and safely in such a way that the belly appears esthetic and without meat wastage after the subsequent removal of the ribs.

- 5 The above-mentioned tool and method are advantageously used to prepare a belly before this is introduced into an apparatus of the type which is disclosed in Danish Patent Application No. 0981/90.

Description of the drawing.

- 10 The invention will now be described in further detail with reference to the accompanying drawing wherein

- Fig. 1 shows a schematic perspective view of a tool according to the invention,
- 15 Fig. 2 shows a view of a further embodiment illustrated in Fig. 1,
Fig. 3 shows a view of a further embodiment illustrated in Fig. 1,
Fig. 4 shows a view of a further embodiment illustrated in Fig. 1,
Fig. 5 shows a view seen from the top side of the embodiment illustrated in Fig. 2,
- 20 Fig. 6 shows a sectional view for illustrating an embodiment of a tool with an embedded metal edge and a casted hinge,
Fig. 7 shows an embodiment of a tool with an embedded, curved metal edge, and
Fig. 8 shows an embodiment of a tool with an embedded straight metal edge.
- 25

In the following a general description is given of the elements which are common to the different embodiments after which the differences between the different embodiments are explained.

30

- Fig. 1 shows a tool 1 according to the invention. As will appear from the drawing the front part of the tool is formed of a segment 2 of a substantially tubular element 3 which continues unbroken at the other end of the tool. The segment is limited by a front circular edge 4 and by two substantially rectilinear edges 5. The rectilinear edges run at an angle of approximately 5-20° in relation to a longitudinal axis 6 of the tubular element 3. Moreover, the tool comprises a substantially triangular plate 7 which is fastened to the segment 2 in any well-known way. The plate 7 is provided with a cutting edge 8 which is lo-
- 35

cated at an acute angle in such a way that it is directed away from the segment and towards the front edge 4. The cutting edge 8 is located a short distance from the front edge 4 as the tool easier can be introduced into and guided between a rib and a bone fascia. The segment is made of a resilient material, preferably plastic. In this case the plate 7 is preferably a metal plate which is fastened to the segment 2 by embedding webs (not shown) in the plastic material for the securing of the plate 7. However, the plate 7 can also be made of plastic. As the segment 2 is made of a resilient material it will easily adapt itself to the contour of the rib against which the tool is pressed and thus the inner cavity will deviate from a circle when the tool is used. The tool can also be made with two parallelly located plates 7 (not shown).

Fig. 2 illustrates an alternative embodiment of a tool 1' which differs from the tool shown in Fig. 1 by having a projecting fang 9 which is fastened to the front circular edge 4. Such a fang 9 appears more clearly from Figs. 5 and 6. When a hard metal apex 14 is used as illustrated in Fig. 6, the cartilaginous tissue between a rib and the meat can advantageously be partially cut off of by means of the tool, which facilitates the severance of the cartilaginous tissue.

The embodiment of the tool 1'' illustrated in Fig. 3 differs from the embodiment shown in Fig. 1 in comprising only the front segment 2 which is limited by the two rectilinear edges 5 and the front circular edge 4. Thus, this tool does not comprise a tubular part. In the embodiments shown in Figs. 1, 2, and 3 it is noted that the front edge 4 is chamfered to allow an easier penetration between a rib and a bone fascia. The front edge of the fang 9 is also chamfered.

Fig. 4 illustrates an embodiment of a tool 1''' comprising an inner segment 2' of plastic and an outer segment 10 of metal. In the direction of the circumference the outer segment has a smaller extension than the inner segment so that the elastic resilient inner segment more readily adapts itself to the contour of a rib. In this embodiment it will be possible to use a relatively soft plastic material for the inner segment 2' as the outer metal segment 10 prevents a deflection or bending of the soft plastic segment 2'. In this embodiment the plate 7 is advantageously fastened releasably to the outer segment 10.

Hereby, the plate 7 can be replaced when the edge 8 has become blunt. The metallic outer segment has a front narrow fang 11 extending across a very small angle at the centre of approximately 5° and which is chamfered to allow penetration between a rib and the fascia. The fang 11 is preferably projecting forward over the front edge 4 of the segment 2'.

Fig. 5 shows how the segment 2 is provided with a fang 9 which is connected with the front edge 4. Fig. 6 shows a sectional view through an embodiment comprising a fang 9 corresponding to the one shown in fig. 4. In this embodiment the fang 9 is connected with the front edge 4 of the plastic segment 2' through a casted hinge 13. The hinge 13 makes it easy for the fang 9 to follow the surface of a rib. The metal apex 14 is connected with the fang 9 by embedment of a part 12 in the plastic material. The embedded part may have any suitable form which is used in the art.

Fig. 7 illustrates an embodiment in which the tool comprises a solid part 14 used for the fastening of the tool in a stand and in which the plate 7 constitutes a forward extension of the solid part. The edge 8 is curved for forming a substantially semicircular periphery which faces forward in the work direction. The segment 2 is a relatively hard plastic and the front edge 4 is chamfered. The plate 7 is advantageously of metal and is fastened to a fin 15 by casting in the plastic of which the fin is made. The fin 15 constitutes an element of the solid part 14, said element being directed forward. On the lowest edge of the fin the segment 2 is embedded together with the fin. In this embodiment the rectilinear edge 5 extends across an angle of 0° in relation to the longitudinal axis 6 of the segment 2. This angle can alternatively be changed and can be up to approximately 20° .

Fig. 8 shows an embodiment corresponding substantially to the one shown in Fig. 7, but having a rectilinear edge 8. The plate 7 is also fastened to the fin 15 which constitutes an element of the solid part. The cutting edge 8 extends from near the front chamfered edge 4 and slanting to the rear.

In this embodiment and in the one shown in Fig. 7 the casting of the plate 7 can be performed in any way which ensures a sufficient fasten-

ing of the plate 7 in the fin 15.

Alternatively, the plate 7 for the casting can be fastened in other ways thus, if necessary, the plate can be replace.

5

Moreover, the embodiments shown in Figs. 7 and 8 can be provided with fangs 9 as described in connection with Fig. 6.

10

In all the embodiments an effective severance of the bone fascia is obtained as the segment 2 first is introduced between the rib and the bone fascia and is guided inside the bone fascia as this has not yet been cut up. Immediately behind the front edge an edge 8 is located which cut up the bone fascia. Alternatively the edge 8 can be located axially in front of the front edge 4. The front edge 4 separates the connection between the rib and the bone fascia over a substantial part of the circumference of the ribs which contributes to allow the rib to be removed subsequently without the bone fascia being torn up and without a simultaneous removal of the meat. The tool and the method can also be used in connection with the separation of other bones, for instance legs of pork.

15

20

25

30

35

C L A I M S:

1. A tool (1) for separating ribs from bellies of slaughtered animals comprising at least one cutting edge (8), c h a r a c t e r i z e d in that the tool consists of a segment (2) of a substantially tubular element (3), said segment being limited by a front circular edge (4) extending across an angle at the centre from approximately 0° to approximately 180° and by two substantially rectilinear edges (5) emanating from the circular edge and running at an angle of approximately 0° to approximately 20° in relation to the longitudinal axis (6) of the tubular element, that the tool is made of a resilient material, that at least the central part of the front circular edge (4) is made from a hard preferably knockproof material, that at least the one of the cutting edges (8) is mounted radially projecting from the outer circumference in a position opposite the front circular edge, and that the cutting edge is directed forward and is mounted at an angle in relation to the longitudinal axis (6).
2. A tool according to claim 1, c h a r a c t e r i z e d in that the front circular edge (4) is chamfered.
3. A tool according to claim 1, c h a r a c t e r i z e d in that the segment (2) comprises an inner segment of plastic and an outer segment of metal and that the outer segment has a smaller extension in the direction of circumference than the inner segment.
4. A tool according to claim 1, c h a r a c t e r i z e d in that the segment (2) is made of plastic and that a central part of the front edge (4) comprises a metal element which is embedded in the plastic segment.
5. A tool according to any of the preceding claims, c h a r a c t e r i z e d in that the edge zone of the front circular edge (4) is connected with the remaining part of the segment (2) through a hinge which preferably is formed when making the element.
6. A tool according to claim 1, c h a r a c t e r i z e d in that the cutting edge (8) is formed in a metal plate (7) which is embedded in the segment and which has a triangular part projecting radially from

the outside of the segment.

5 7. A tool according to claims 1 or 6, characterized in being provided with two cutting edges (8) which are both located opposite the front edge (4) substantially symmetrically around a radial centre plan through the segment.

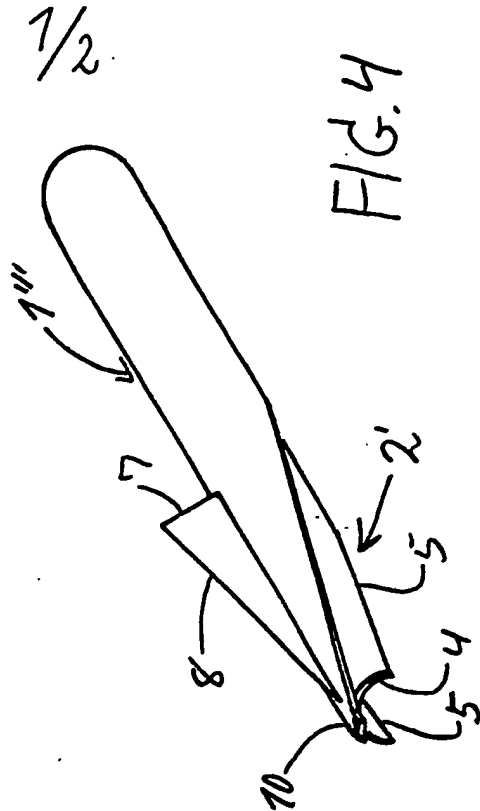
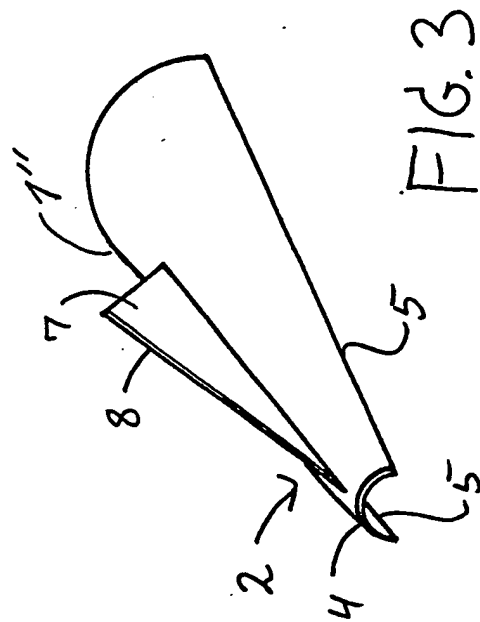
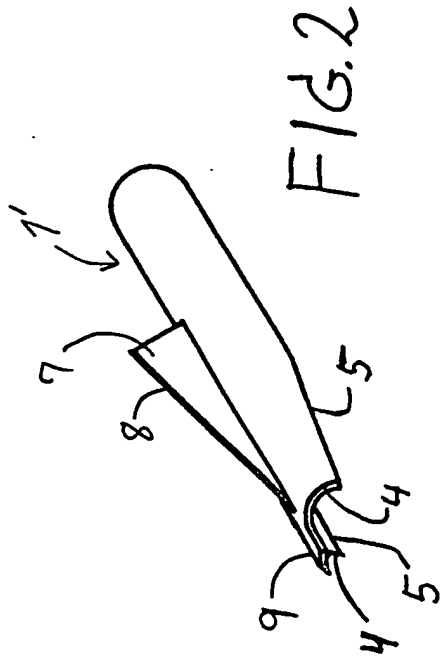
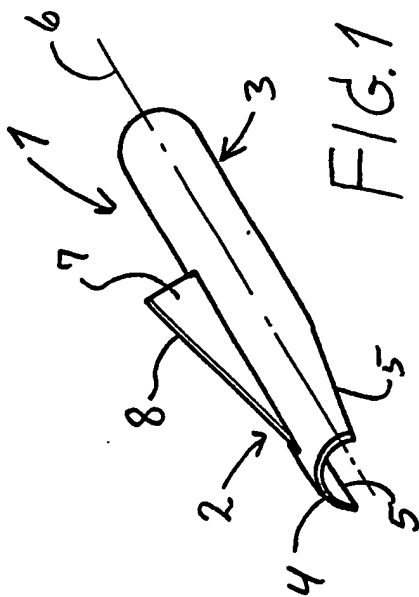
10 8. A method of separating ribs from bellies of slaughtered animals by means of a tool according to any of the preceding claims, characterized in comprising the steps of guiding the front circular edge (4) between the rib and the bone fascia with the radially orientated edge (8) turned away from the rib, pressing forward the tool manually or mechanically along the rib with the front edge of the segment abutting the rib, and guiding the tool past the cartilaginous
15 tissue between the rib and the meat.

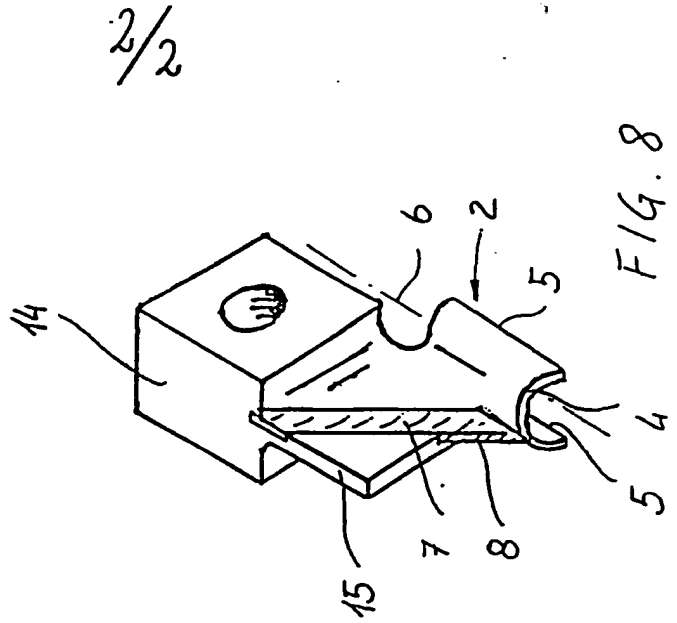
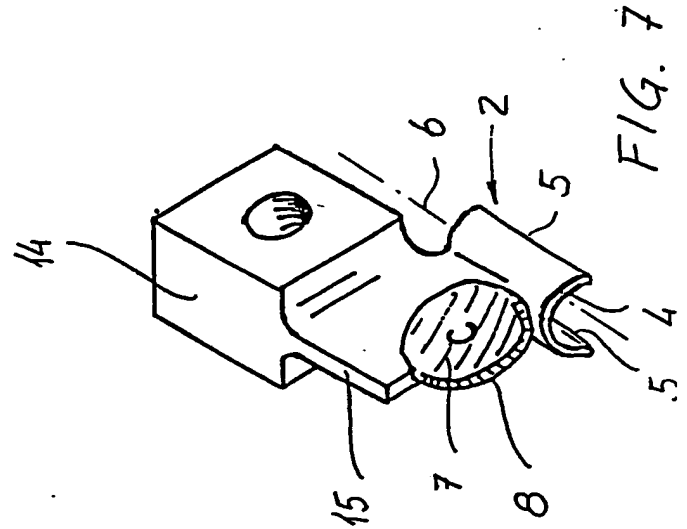
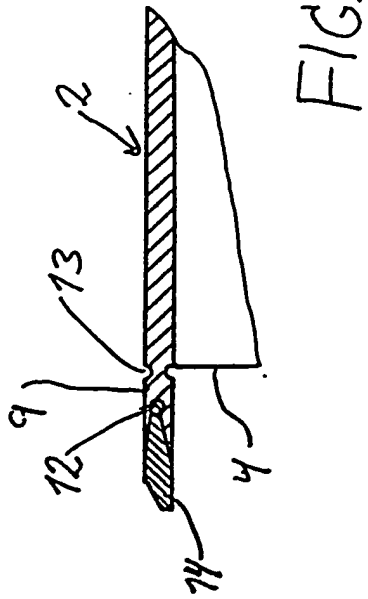
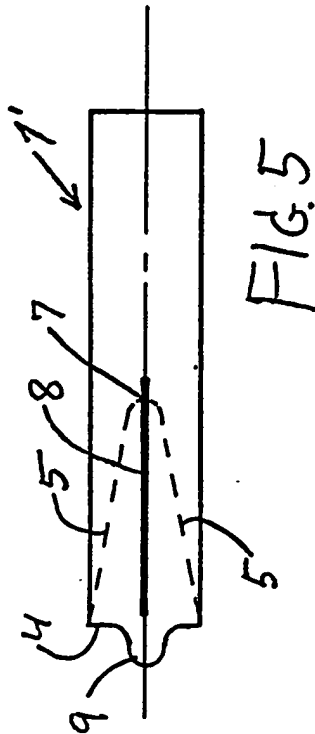
20 9. A method according to claim 8, characterized in that the cartilaginous tissue is further pre-treated by cutting open the bone fascia close to the cartilaginous tissue, performing said cut at an inclined angle in relation to the extension of the rib, and preferably performing the cut by means of a substantially U-shaped edge tool which is provided with a cutting edge at the ends of each prong, said edge guiding the cut partially behind the rib in such a way that the cut extends over half of the circumference of the rib.

25

30

35





INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 91/00266

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 22 B 3/10, A 22 C 17/00											
II. FIELDS SEARCHED <div style="text-align: right; margin-right: 100px;">Minimum Documentation Searched⁷</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="padding: 5px;">IPC5</td> <td style="padding: 5px;">A 22 B; A 22 C</td> </tr> </table> <div style="text-align: center; margin-top: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸</div>			Classification System	Classification Symbols	IPC5	A 22 B; A 22 C					
Classification System	Classification Symbols										
IPC5	A 22 B; A 22 C										
SE,DK,FI,NO classes as above											
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; padding: 5px;">Category *</th> <th style="width: 70%; padding: 5px;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 20%; padding: 5px;">Relevant to Claim No.¹³</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, A1, 2709615 (KOCH, JOSEF) 3 November 1977, see figures 5-7</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,8</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, A1, 3802466 (PROJEKTIERUNGS- UND CONSULTINS-GMBH) 10 August 1989, see the whole document</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1,8</td> </tr> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	DE, A1, 2709615 (KOCH, JOSEF) 3 November 1977, see figures 5-7	1,8	A	DE, A1, 3802466 (PROJEKTIERUNGS- UND CONSULTINS-GMBH) 10 August 1989, see the whole document	1,8
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³									
A	DE, A1, 2709615 (KOCH, JOSEF) 3 November 1977, see figures 5-7	1,8									
A	DE, A1, 3802466 (PROJEKTIERUNGS- UND CONSULTINS-GMBH) 10 August 1989, see the whole document	1,8									
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p> </div> </div>											
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search 10th December 1991 </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center;">1991-12-13</div> </td> </tr> <tr> <td style="padding: 5px;"> International Searching Authority <div style="text-align: center; margin-top: 10px;">SWEDISH PATENT OFFICE</div> </td> <td style="padding: 5px;"> Signature of Authorized Officer <div style="text-align: center; margin-top: 10px;"> Agneta Ånggård </div> </td> </tr> </table>			Date of the Actual Completion of the International Search 10th December 1991	Date of Mailing of this International Search Report <div style="text-align: center;">1991-12-13</div>	International Searching Authority <div style="text-align: center; margin-top: 10px;">SWEDISH PATENT OFFICE</div>	Signature of Authorized Officer <div style="text-align: center; margin-top: 10px;"> Agneta Ånggård </div>					
Date of the Actual Completion of the International Search 10th December 1991	Date of Mailing of this International Search Report <div style="text-align: center;">1991-12-13</div>										
International Searching Authority <div style="text-align: center; margin-top: 10px;">SWEDISH PATENT OFFICE</div>	Signature of Authorized Officer <div style="text-align: center; margin-top: 10px;"> Agneta Ånggård </div>										

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/DK 91/00266

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on 31/10/91. The Swedish Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A1- 2709615	77-11-03	AT-B- 353124	79-10-25
		CH-A- 604536	78-09-15
		FR-A-B- 2357181	78-02-03
		CH-A- 597762	78-04-14
DE-A1- 3802466	89-08-10	NONE	

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.